ANALYSIS OF NURSING CARE IN MRS. I WITH HEMORRHAGIC STROKE-INDUCED NEUROLOGICAL IMPAIRMENT: APPLICATION OF 30° HEAD ELEVATION TO MANAGE INTRACRANIAL PRESSURE IN THE ICU AT RSUD CILILIN, 2025.

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ABSTRACT

Hemorrhagic stroke is a neurological emergency caused by the rupture of cerebral blood vessels, leading to intracranial bleeding and increased intracranial pressure (ICP). This study aims to analyze nursing care for Mrs. I with nervous system disorders due to hemorrhagic stroke (PIS) through the application of a 30° head-up position to reduce ICP in the ICU of Cililin Regional Public Hospital in 2025. The research design is a descriptive analytical case study. The subject was a 65-year-old female patient with a history of hypertension and diabetes mellitus. Interventions included assessment, nursing diagnosis, intervention, implementation, and evaluation based on SDKI, SIKI, and SLKI, focusing on the 30° head-up position. Results showed a decrease in ICP, blood pressure stabilization, and improved consciousness (GCS increased from E1 M3 V2 to E4 M5 V2). The application of the 30° head-up position proved effective as a non-pharmacological intervention to reduce cerebral congestion and improve cerebral perfusion. It can be concluded that integrated nursing care with the 30° head-up position is effective in managing hemorrhagic stroke patients in the ICU.

Keywords : *Hemorrhagic Stroke, 30° Head-Up Position, Intracranial Pressure, ICU*

INTRODUCTION

Hemorrhagic stroke is a neurological emergency that occurs due to the rupture of a blood vessel in the brain, causing bleeding into brain tissue or surrounding spaces. This type of stroke accounts for approximately 10–15% of all stroke cases but has significantly higher mortality and morbidity rates compared to ischemic stroke (Setiawan, 2021). Prompt and appropriate management is essential to prevent further brain damage caused by increased intracranial pressure (ICP) and cerebral edema. According to the World Health Organization (WHO), hemorrhagic stroke accounts for approximately 15% of total stroke cases globally (2021). In Indonesia, approximately 20–30% of all stroke cases are intracerebral hemorrhage (ICH) (Regional Health Office Report, 2018). In 2022, stroke became a catastrophic disease with 2.54 million cases, representing a 30% increase from the previous year. In West Java, the prevalence of stroke reached 11.4% or approximately 131,846 individuals (Riskesdas, 2018).

In nursing practice, head elevation is one of the important non-pharmacological interventions for patients with hemorrhagic stroke. A 30° head-up position has been shown to help reduce intracranial pressure, improve venous drainage from the brain, and decrease the risk of brain herniation (Ramos MB et al., 2024). However, excessive elevation may reduce cerebral perfusion. Based on preliminary observations through interviews with ICU nurses, stroke cases are frequently encountered, presenting with symptoms such as sudden decreased consciousness, severe headache, and hemiparesis. Common nursing diagnoses include ineffective cerebral tissue perfusion, risk of increased intracranial pressure, and impaired physical mobility. This study aims to analyze nursing care in patients with hemorrhagic stroke through the implementation of a 30° head-up position in the ICU of RSUD Cililin.

Based on preliminary findings obtained through interviews with ICU nurses regarding nursing care for patients with hemorrhagic stroke, it was reported that stroke cases are frequently encountered in the unit, and most patients are admitted in an unconscious condition. Common early clinical manifestations of intracerebral hemorrhage include sudden decreased level of consciousness, abrupt severe headache, vomiting without nausea, and unilateral body weakness (hemiparesis). Patients may also present with signs of increased intracranial pressure such as anisocoria, seizures, or acute hypertension without prior history.

Previous studies have demonstrated the physiological benefits of head elevation in patients with increased intracranial pressure. Emery et al. (2003), as well as Durward et al. and Feldman et al., reported that a 30° head-up position significantly reduces intracranial pressure. This effect is attributed to decreased jugular venous pressure and improved cerebral venous drainage. These studies also observed a reduction in heart rate ranging from 0.76% to 5.6% and a statistically significant decrease in blood pressure ($p < 0.05$).

Furthermore, Van Bredore et al. reported that a 15° head-up position significantly reduces systolic blood pressure ($p < 0.05$). Similarly, studies conducted by Durward et al. and Lee et al. demonstrated that head elevation between 15° and 30° results in a progressive decrease in arterial pressure and central venous pressure ($p < 0.05$), with reductions ranging from 0.12 to 1.8 cm.

Regarding interventions, ICU nurses explained that one of the primary measures for managing increased intracranial pressure is head elevation at 30°. This position helps reduce intracranial pressure and promotes cerebral venous drainage. Additional interventions include regular monitoring of the Glasgow Coma Scale (GCS), periodic pupil assessment, maintenance of arterial carbon dioxide levels within the normal range ($PaCO_2$ 35–40 mmHg), and

administration of medications such as mannitol or hypertonic saline according to physician orders. Nurses also avoid maneuvers that may increase intracranial pressure, such as forceful coughing and inadequate suctioning, and provide light sedation when necessary.

The head-up position is implemented when patients exhibit signs of increased intracranial pressure, including projectile vomiting, decreased level of consciousness, anisocoria, or acute hypertension. Collaborative care is strongly emphasized during treatment, including medication administration, neurological monitoring, ventilatory management, fluid and electrolyte regulation, and nutritional management in collaboration with dietitians.

In terms of evaluation, nurses assess the effectiveness of nursing care by monitoring improvement in consciousness level, normalization of vital signs, laboratory results, urine output, and reduced dependence on supportive devices. Key indicators of successful outcomes include improved GCS scores, hemodynamic stability, and successful ventilator weaning. Nurses play a critical role in monitoring patient positioning and identifying early signs of neurological deterioration. Therefore, comprehensive nursing care with a focus on appropriate head positioning is an essential component in the management of patients with hemorrhagic stroke in intensive care or stroke units.

METHODS

This study employed a descriptive analytical single-case study design using the comprehensive nursing care process approach, aligned with the Indonesian Nursing Standards (SDKI for diagnosis, SIKI for interventions, SLKI for outcomes). The study was conducted in the Intensive Care Unit (ICU) at RSUD Cililin, a regional public hospital in West Java, Indonesia, from October 29 to November 1, 2025. The purposive sampling selected one female patient with a confirmed medical diagnosis of hemorrhagic stroke (intracerebral hemorrhage) admitted to the ICU, presenting with neurological impairment and signs of elevated intracranial pressure (ICP). Exclusion criteria included patients with concurrent major comorbidities requiring immediate surgical intervention (e.g., decompressive craniectomy) or those unable to tolerate head elevation due to hemodynamic instability at baseline.

Ethical considerations were prioritized in accordance with the Declaration of Helsinki and Indonesian ethical guidelines for health research (Permenkes No. 20/2017). This study received ethical clearance from the Institutional Review Board/Ethics Committee of Institut Kesehatan Rajawali (approval number: [insert actual number, e.g., 005/KEPK/IKR/2025], dated [insert date, e.g., October 2025]). Informed consent was obtained from the patient's family proxy (as the patient was unconscious/soporous) for participation, data collection, use of anonymized clinical information, and potential publication. Confidentiality was maintained by using pseudonyms (Mrs. I) and securing all records.

Data collection was systematic and multi-method, conducted over four days:
Assessment:

Daily comprehensive neurological assessment using the Glasgow Coma Scale (GCS; scored every 1–4 hours), pupil response, vital signs (blood pressure, heart rate, respiratory rate, SpO_2 via non-invasive monitoring), and signs of increased ICP (e.g., headache proxy via family report, vomiting, anisocoria). Data also included medical record review (CT scan confirmation of ICH, laboratory results including blood glucose for diabetes management) and semi-structured

interviews with the patient's family (on pre-admission history) and ICU nurses (on routine practices).

Nursing diagnoses:

Formulated based on SDKI (e.g., decreased intracranial adaptive capacity, risk of ineffective cerebral tissue perfusion).

Planning and intervention:

Primary independent intervention was consistent 30° head-up positioning (using adjustable bed, measured with protractor/angle tool for accuracy, maintained except during nursing procedures or physician orders). Collaborative interventions included vital signs monitoring, airway clearance, fluid balance, and medication administration per physician (e.g., antihypertensives, mannitol if ordered).

Implementation:

Position applied immediately upon stable baseline (after initial assessment); monitored for tolerance (no hypotension, vomiting, or discomfort). Duration: continuous except brief changes.

Evaluation: Daily comparison of pre- and post-intervention parameters against SLKI criteria (e.g., improved GCS, stabilized BP indicating better intracranial adaptation).

Data analysis was purely descriptive and comparative, focusing on trends in key indicators (GCS total score, systolic/diastolic BP) before (baseline) and after intervention (Days 1–3). No inferential statistics were applied due to the single-case nature. Changes were presented narratively and in tabular form for clarity..

RESULTS AND DISCUSSION

The patient, Mrs. I, a 63-year-old female, was admitted to the Intensive Care Unit (ICU) with a medical diagnosis of hemorrhagic stroke and a history of hypertension and type II diabetes mellitus. On initial assessment, the patient presented with decreased level of consciousness with a Glasgow Coma Scale (GCS) score of E1M3V2, blood pressure of 189/76 mmHg, and a severe general condition with a soporous state.

The primary nursing intervention implemented was the application of a 30° head-up position accompanied by continuous monitoring of vital signs and neurological status.

Following the implementation of the intervention, the patient demonstrated clinical improvement, including an increased level of consciousness with a GCS score of E4M5V3 and stabilization of blood pressure to 130/76 mmHg. Neurological responses improved, and the patient’s hemodynamic condition became more stable.

The changes in the patient’s clinical condition before and after the intervention are presented in Table 1.

Table 1. Daily Changes in Level of Consciousness and Blood Pressure During 30° Head-Up Intervention

Day of Observation	Date	GCS	Blood Pressure (mmHg)
Baseline (Day 0)	29 October 2025	E1 M3 V2 (6)	189/76
Day 1	30 October 2025	E2 M3 V2 (7)	158/74

Day 2	31 October 2025	E2 M4 V2 (8)	142/73
Day 3	1 November 2025	E4 M5 V2 (11)	126/70

Table 2. Summary of Nursing Diagnoses, Interventions, and Outcomes (based on SDKI/SIKI/SLKI).

Nursing Diagnosis (SDKI)	Intervention (SIKI)	Outcome (SLKI)	Pre-Intervention	Post-Intervention (Day 3)
Decreased intracranial adaptive capacity	Positioning: Head-up 30°	Intracranial adaptive capacity improved	GCS 6, BP 189/76	GCS 11, BP 126/70
Risk of ineffective cerebral tissue perfusion	Neurological monitoring (GCS, pupil)	Cerebral perfusion improved	High risk	Stabilized
Impaired physical mobility	Range of motion, positioning	Mobility status	Dependent	Improved awareness

During the observation period, the patient demonstrated progressive improvement in neurological status and hemodynamic stability following the implementation of the 30° head-up position. At baseline, the patient presented with a soporous level of consciousness with a Glasgow Coma Scale score of E1M3V2 (GCS 6) and elevated blood pressure of 189/76 mmHg.

On the first day of intervention, the level of consciousness improved to somnolence with a GCS score of E2M3V2 (GCS 7), accompanied by a reduction in blood pressure to 158/74 mmHg. On the second day, further neurological improvement was observed with a GCS score of E2M4V2 (GCS 8) and blood pressure decreased to 142/73 mmHg.

By the third day of evaluation, the patient's level of consciousness improved significantly to GCS E4M5V2 (GCS 11) despite the presence of delirium, and blood pressure stabilized at 126/70 mmHg. These findings indicate gradual improvement in cerebral perfusion and intracranial adaptation during the intervention period.

Discussion

This case study presents the nursing management of a 63-year-old female patient with hemorrhagic stroke treated in the Intensive Care Unit over four days. The patient initially presented with decreased consciousness (GCS E1M3V2), uncontrolled hypertension, and a history of type II diabetes mellitus, which are well-established risk factors for intracerebral hemorrhage and increased intracranial pressure. Chronic hypertension contributes to structural weakening of cerebral blood vessels, making them more susceptible to rupture, while diabetes mellitus accelerates vascular endothelial damage and impairs cerebral circulation (Black & Hawks, 2022; Smeltzer & Bare, 2020).

Comprehensive nursing care was implemented using a systematic nursing process consisting of assessment, diagnosis, planning, implementation, and evaluation (Potter & Perry, 2020). Priority nursing diagnoses identified in this case included decreased intracranial adaptive capacity, risk of ineffective cerebral perfusion, ineffective airway clearance, impaired physical mobility, and self-care deficit. These findings are consistent with common nursing problems observed in patients with hemorrhagic stroke due to impaired cerebral circulation and neurological dysfunction (Retnaningsih, 2023).

A key non-pharmacological intervention applied in this case was positioning the patient in a 30° head-up position. This intervention has a strong physiological basis, as head elevation facilitates cerebral venous outflow, reduces intracranial blood volume, and helps lower intracranial pressure while maintaining adequate cerebral perfusion (Agustin et al., 2025; Guyton & Hall, 2021). In addition, head elevation improves pulmonary ventilation and oxygen delivery to brain tissue, thereby reducing the risk of secondary brain injury.

Clinical evaluation demonstrated gradual improvement in neurological status and hemodynamic stability, reflected by increased GCS scores and controlled blood pressure during the observation period. These outcomes support previous findings that appropriate positioning combined with comprehensive nursing care contributes significantly to improved cerebral perfusion and stabilization of patients with hemorrhagic stroke in critical care settings (Ramos et al., 2024).

Overall, this case highlights the essential role of evidence-based nursing interventions in optimizing neurological recovery and preventing complications in patients with hemoragic stroke.

CONCLUSION

This case study demonstrates that comprehensive nursing care for a 63-year-old female patient with hemorrhagic stroke in the ICU at RSUD Cililin in 2025, with the primary application of a 30° head-up position as a key non-pharmacological intervention, was effective in managing elevated intracranial pressure (ICP) and enhancing cerebral perfusion. Implemented consistently alongside vital signs and neurological monitoring (per SDKI, SIKI, and SLKI frameworks), the intervention resulted in significant clinical improvements: GCS score increased from E1M3V2 (total 6) to E4M5V2 (total 11) within three days, blood pressure stabilized from 189/76 mmHg to 126/70 mmHg, and signs of cerebral congestion diminished without major hemodynamic complications. These outcomes align with physiological evidence that a 30° head elevation promotes cerebral venous drainage, reduces intracranial blood volume, and maintains balanced cerebral perfusion pressure (CPP), thereby preventing herniation and secondary brain injury. Overall, integrated, evidence-based nursing care emphasizing the 30° head-up position serves as an effective, safe, and nurse-led strategy to optimize neurological recovery, stabilize hemodynamics, and prevent complications in hemorrhagic stroke patients in critical care settings.

Although international guidelines and systematic reviews support 30° head-of-bed elevation as a low-risk, tier-zero intervention for reducing ICP in acute brain injuries by enhancing cerebral venous drainage and preserving cerebral perfusion pressure (CPP) without significant hemodynamic compromise (Ramos et al., 2024; Cook et al., 2020; Sattur et al., 2023), evidence in hyperacute intracerebral hemorrhage (ICH) remains mixed, particularly following neutral results from the HeadPoST trial in mixed stroke populations. Clinician practices often

continue to favor 30° elevation in ICH due to physiological rationale (Dusenbury et al., 2023). However, most existing data originate from high-resource settings with invasive ICP monitoring, while studies in Indonesia predominantly focus on ischemic stroke or post-craniectomy cases, with limited documentation of hemorrhagic stroke management in regional/rural ICUs lacking advanced monitoring tools. This single-case study addresses this gap by demonstrating the feasibility and effectiveness of 30° head elevation as a nurse-led, non-pharmacological intervention in a resource-constrained regional hospital (RSUD Cililin), using standardized national nursing frameworks (SDKI, SIKI, SLKI) and providing objective clinical outcomes (GCS improvement from 6 to 11 and blood pressure stabilization) over a short period. The novelty lies in its context-specific application to spontaneous ICH in a low-resource Indonesian ICU setting, contributing practical evidence to support replicable, low-cost protocols for similar facilities.

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Declaration of Generative AI

During the preparation of this work, the author(s) used Grok (built by xAI) for assistance in structuring the Conclusion section, refining academic language, and ensuring clarity and consistency. After utilizing this tool/service, the author(s) thoroughly reviewed and edited the content as necessary and take full responsibility for the final content of the published article.

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